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"EFFECT OF FISH FEED ON SOME ASPECTS OF BIOLOGY AND BIOCHEMICAL COMPOSITION OF *CHANNA STRIATUS* (BLOCH, 1793)"

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SHORT RESUME/ SYNOPSIS OF Ph.D. TOPIC

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Introduction

Aquaculture is the world's fastest growing food production sector and plays a crucial role in food and nutritional security by the farming of aquatic animals (Kumari, 2018). Striped snakehead, *Channa striatus*, locally known as shol in Bangladesh belonging to the family of Channidae, is one of the favourite freshwater fishes in the Asia-Pacific countries. It is commonly available in the rivers, lakes, swamps, marshes, beels, haors and ponds (M N Sarowar, 2010). *Channa striatus* is the most important (economically) member of the genus. The flesh is firm, partially boneless and of a most delicious flavor. According to Huda (1959), fleshy edible portion of its body contains 1.1% fat and 78.3% water. The intensification of aquaculture has provided viable solutions for increasing aquaculture production system. However, it generates increasing inputs on the ponds such as artificial feed (R Gustiano1, 2021).

Channa Striatus is an important food fish in its entire native range, and is of considerable economic importance. Adults are dark brown in colour with faint black bands visible across its entire body. Males and females both help to construct a nest out of water vegetation during breeding time. Eggs are guarded by both parents. Fry are reddish orange and are guarded by both parents until they turn greenish brown at around 5–6 cm. It is common in freshwater, where it migrates from rivers and lakes into flooded fields. Subsequently, it returns to permanent water bodies in the dry season, where it survives by burrowing in the mud.

Fish is highly nutritive and rich source of animal proteins. For the improvement of fisheries and to achieve maximum yields from resources of fresh water, it is necessary to provide artificial feed, by which fish grows rapidly and attains maximum weight in shortest possible time (S V Bhosale, 2010). Among all the nutrients required by fish for growth and maintenance, protein is one of the most important and initial constituent, which comprises about 65-70% of the dry weight of fish muscle, and is also metabolized as an energy source by fish (Khan*, 2017).

Fish supplements provided as proteins, fats, vitamins and minerals. The purpose of feeding fish is to provide necessary nutrient requirements for keeping fish in good health, optimal growth, and optimum yield, and to minimize the waste brought to the environment for the best profit by a reasonable cost. The good nutritional quality and physical properties of the feed are the key to the fishery technology achieving its production and economic goals. Fishes are small creatures, harmless most of the time yet they are so important in our lives. Fish is also the only non-vegetarian food that is extremely healthy to humans as it contains the Omega-3 Fatty Acids**.** Nutrition is the science of the interaction of a nutrient with some part of a living organism, including feed composition, ingestion, energy liberation, wastes elimination and synthesis for maintenance, growth and reproduction. Feeds and feed stuffs contain the energy and nutrients essential for the growth, reproduction and health of aquatic animals. Deficiencies or excesses can reduce growth or lead to disease. Dietary requirements set the necessary levels for energy, protein, amino acids, lipids (fat), minerals and vitamins. The subcommittee on Fish Nutrition of the Committee on Animal Nutrition of the National Research Council (NRC) examines the literature and current practices in aquaculture. The NRC publishes the nutritional recommendations for fishes. Dietary nutrients are essential for the construction of living tissues. They are also a source of stored energy for fish digestion, growth, reproduction and the other life processes (E Prabu, 2017).

Feed additives are eatable substances that are included in fish feeds in very little quantity to improve the feeds which in returns improve the growth performance and decrease mortality rate in fish (OGUNKALU, 2019). When fish are reared in high-density indoor systems or confined in cages and cannot forage freely on natural food (e.g., algae, aquatic plants, aquatic invertebrates, etc.), they must be provided a complete diet (David D. Kuhn).

There are three types of food used in fish ponds: natural food; supplementary feeds and complete feeds.Proper feeding management and the use of high-quality feed play a crucial role in maximizing feed efficiency, reducing production costs, and minimizing environmental impact in aquaculture. The sustainable development of aquaculture heavily relies on factors such as fish nutrition, feeds, and feeding practice (B. Sravanthi, 2023).

Fish meal has traditionally been the main protein source in formulated feeds for carnivorous fish, but FM production is being reduced and prices have increased, so alternative protein sources for aquatic animals are needed. Among plant protein ingredients,

soybean meal (SBM) is considered as the most nutritive. However, the high concentration of anti-nutritional factors, such as trypsin inhibitor, antigens, lectins, saponins and oligosaccharides, can have negative effects on digestibility of nutrients and performance of fish (HIEN, 2016). The nutritional alternatives plant essential oils (EOs) have been evaluated and reported in fish production in order to enhance the resistance to diseases and prevent outbreaks, as well as to improve fish growth, animal welfare and feed utilization (Fernando J. Sutili, 2017).

The present study deals with the investigation on the impact of feed on some aspects of Biology and Biochemical composition of fish *Channa striatus*.

Purpose of carrying out proposed research work

Conservation strategy should be undertaken and taking fishes in every day diet may result in better and advanced protection against coronary heart disease and other lifestyle related disease. For that purpose, we have to aware the people for increasing the production as well as biochemical content of fishes giving with different feeds as natural as well as artificial.

The amino acid composition of *Channa striatus* muscle tissue shows that it is a good source of dietary amino acid. All the essentially amino acids required to human can be obtained from *Channa striatus*. Furthermore, most of the essential amino acids are present in higher quantities compared to Catfish, Rainbow trout or Atlantic salmon. *Channa striatus* is found rich in arginine, which is useful for the process of wound healing. It also supplies physiological beneficial amino acids, such as histidine. Therefore, in view of the potential values of its amino acid contents, *Channa striatus* serves as a nutritious health food.

Review of Literature

A review of literature given as under indicates that the study which is planned through the selected method and fish is less worked out in Nanded district.

Rajesh Kumar, this review discusses up-to-date knowledge on captive seed production of striped murrel, emphasizing the recent developments including hormone pellet implantation and captive maturation of broodstock, inducing hormone dosage manipulation, weaning and cannibalism management, nutritional and environmental interventions to increase breeding success and profit in mass-scale striped murrel seed production. (Rajesh Kumar M. G., 2022)

Datta, S.N., Kaur, V.I., Dhawan, A. *et al.* in his work mention following details. Estimation of length-weight relationship and condition factor of spotted snakehead *Channa punctata* (Bloch) under different feeding regimes (Datta).

Fernando Jonas Sutili, in his work mention following details. Nutritional strategies focused on the use of phytochemicals as modulators of immunological and physiological responses, as well as antistress and antioxidant therapies and health promoters of the gastrointestinal tract have attracted increased interest in animal production.

Sarowar et. al., observed a 28 days long experiment was conducted with a view to observe the effects of different feeds on growth and survival of one month old *Channa striatus* Fry to develop a rearing technique for promoting its aquaculture. There were three treatments, each having three replications, stocked with 40 fry having an initial weight and length of 392.2±0.21 mg and 37.50±0.10 mm, respectively in a cistern of 240×70×40 cm^3. Three different diets i.e. Chopped silver carp fry, formulated feed and live tubificid worms – having different protein levels were administered to compare their suitability as food for the rearing of *C. striatus* Fry. The fry fed with live tubificid worms showed significantly better results in terms of weight and length gain, percent weight and length gain and specific growth rate (SGR%) compared to the rest two treatments.

Muntaziana et.al., Shows the fry fed with Trash fish showed the best specific growth rate value as compared to Acetes shrimp and bloodworm. It concluded that Trash fish was an excellent fish for C. striatus Fry in term of growth, weight gain and FCR.

Importance of the Study

The careful balance of nutrients in the feed composition is crucial for the health and growth of *Channa striatus*. The feed was meticulously formulated to ensure appropriate levels of moisture, lipids, protein, fibres, carbohydrates, minerals, and vitamins. This meticulous approach assures that the fish receive all the essential nutrients they need for their well-being.

For commercial purposes, creating the ideal feed involves precise calculations to determine the right proportions of ingredients and additives which is beneficial in fish farming. The main goal is to meet the specific nutrient requirements of *Channa striatus* for optimizing production efficiency.

- **International Status**

Attention was also given to incorporating some feeds to enhance the fish's gut health, growth and overall immune system in many countries like U.S.A, Canada, China, Thailand, Malaysia, etc.

- **National Status**

Fish Farmers can enhance their fish production while optimizing resource usage by obtaining valuable insights into culture techniques and nutritional requirements. The work like effect of feeding rate on growth, survival and cannibalism are carried out in Andhra Pradesh, Maharashtra, Bengal, Tamil Nadu, Punjab, etc.

- **Regional Status**

The proposed study provides valuable guidance for fish farmers, enabling them to enhance their feeding practices for *Channa striatus*. By implementing the suggested strategies, fish farmers can achieve improved yields, economic gains, and environmentally sustainable aquaculture practices for *Channa striatus*, leading to improved yields, economic benefits, and sustainable aquaculture practices. A review of literature shows that very few efforts have been done in Marathwada region.

- **Scope of the study**

The proposed study will helps to understand some aspect of biology of freshwater fish *Channa striatus*. This study helps to improve fish farm environment and ensure healthy growth of the fish stock.

This study improves the economic quality of *Channa* fish after feeding and also the biochemical composition in them which are beneficial for human beings.

Objectives of the proposed research work

A review of literature shows that very few efforts have been made so far to study the effect of fish feed on some aspects of biology and biochemical composition of fish *Channa striatus*. The present study is an attempt to investigate the effect of fish feed on some aspects of Biology and Biochemical composition of fish *Channa striatus*.

The objectives of the study are :-

- To Study the Morphometric characters of the fish *Channa striatus*.
- To Study the effect of feed on length and weight of the fish *Channa striatus*.
- To study the effect of feed on Fecundity of the fish *Channa striatus*.
- Assessment of effect of feed on some Haematological parameters of fish *Channa striatus.*
- Assessment of effect of feed on Biochemical composition (Glycogen, Protein and Lipids) from the different tissues of the fish *Channa striatus*.

Hypothesis

The hypothesis states that, the different feeds given to fish is directly improves the growth as well as production yield. After feeding fish, the biochemical content of the fish such as proteins, carbohydrates, lipids, vitamins and minerals increases which can directly used as supplement nutrients such as food supplements and in pharmaceuticals.

Methodology to be adopted

- The freshwater fishes *Channa striatus* will be collected from the Godavari river, Nanded (M.S.) from local fisherman. The fishes were brought to the laboratory and kept in aquarium for experiments.
- Different types of feed will be provided to fish.
- Fish length-weight relationship, Fecundity, Haematological study and Biochemical study will be carried out by Standard method.

Limitations of the work

- Overfeeding is uneconomical and may also result in poor water quality and production losses.
- Small fish need more food and care than larger ones.
- The feeding frequency should be reduced as the water temperature cools down, or if it exceeds optimum levels.

Expected Outcome

From the proposed study, the feed given to fish is useful to maintain body functions of fishes such as blood circulation and routine respiration; and growth, increasing in size and

producing eggs. Which incurring high production costs. *Channa striatus* is a carnivorous species with a high content of essential amino acids and good amount of fatty acids which can directly improve tissue growth, wound healing, supplement nutrients such as food supplements and pharmaceuticals.

In the present study, the focus is on fish production yield, with particular attention to the role of feed. By maintaining optimum hydrographic parameters, get the impressive yields without causing harm to the surrounding ecosystem. This successful outcome generated significant revenue for farmers.

The direction of this research work can be depend upon the time to time observation, to attain the best expected result.

Year-wise plan of work

- **First Year-** Review of literature, Collection of References, Material and Methods, Collection of samples and Morphometric study of fish will be done.

- **Second Year-** Collection and Preparation of feed for the fish. Study of length-weight relationship and Fecundity of *Channa striatus* fish.

- **Third Year-** Assessment of Haematological & Biochemical composition of different tissues of *Channa striatus*. Writing of thesis and submission of final synopsis and thesis will be done in third year.

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